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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. |
|-----------------|-------------|----------------------|---------------------|
| 09/247,816      | 02/09/99    | DORBIE               | A 20545.0006(1)     |

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EXAMINER

CAO, H

ART UNIT

PAPER NUMBER

2671

DATE MAILED:

08/28/01

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

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|------------------------------|-------------------------------|-------------------------------|--|
| <b>Office Action Summary</b> | Application No.<br>09/247,816 | Applicant(s)<br>DORBIE, ANGUS |  |
|                              | Examiner<br>Huedung X Cao     | Art Unit<br>2671              |  |

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 May 2001.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. § 119**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

**Attachment(s)**

- |   |  |
|---|--|
| 15) <input type="checkbox"/> Notice of References Cited (PTO-892)                             | 18) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 16) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 19) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 17) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 20) <input type="checkbox"/> Other: _____                                    |

### DETAILED ACTION

1. A substitute specification including the claims is required pursuant to 37 CFR 1.125(a) because a new specification is required if a number of nature of the amendments render it difficult to consider the application or to arrange the paper for printing or copying.

2. A substitute specification filed under 37 CFR 1.125(a) must only contain subject matter from the original specification and any previously entered amendment under 37 CFR 1.121. If the substitute specification contains additional subject matter not of record, the substitute specification must be filed under 37 CFR 1.125(b) and must be accompanied by: 1) a statement that the substitute specification contains no new matter; and 2) a marked-up copy showing the amendments to be made via the substitute specification relative to the specification at the time the substitute specification is filed.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aleksicy (#5,977,980) in view of Ouaknine et al. (#6,091,422).

As per claim 1 Aleksicy teaches a method for culling occluded objects from an image being rendered into a frame buffer, the method, performed by host processor, comprising:

constructing a coarse Z-buffer, the coarse Z-buffer subdivide into a series of tiles, each tile having an associated depth value (col. 2, lines 25-31, and fig. 1). It is noted that Aleksicy does not explicitly disclose the coarse Z-buffer subdivide into a series of tiles; however, Aleksicy's computer display being divided into a plurality of tiles suggests the same idea of dividing the Z-buffer into a series of tiles. Furthermore Ouaknine teaches that the step of dividing Z-buffer into a series of tile is widely used in the art (Ouaknine, col. 5, lines 65-66). Thus, it would have been obvious to one of ordinary skill in the art to combine Ouaknine's teaching into Aleksicy's system by culling occluded objects to improve the efficiency of the video graphics.

updating the depth values of the coarse Z-buffer using Z information from the frame buffer (Aleknine, col. 2, lines 43-45); and

using the depth values to selectively discard the occluded objects from the image being rendered (Aleknine, col. 1, lines 36-39).

As per claim 2: updating depth values is performed synchronously as information in the frame buffer changes (Ouaknine, col. 7, lines 34-64).

As per claim 3: updating the depth values is performed asynchronously (Ouaknine, col. 5, lines 32-40).

As per claim 4: the step of using the depth values to selectively discard the occluded objects further comprises:

constructing a surrogate volume for an object (Aleknine, col. 3, lines 25-26) and Ouaknine teaches in col. 18-29; and

comparing nearest Z-values of the surrogate volume to the depth value of a tile that includes the surrogate volume (Alekcisy, col. 3, line 33 to col. 4, line 7).

As per claim 5 and similar claim 7: a method in claim 4 further comprise the step of transforming the surrogate volume from object space to eye space (Ouaknine, figures 7a-7c).

As per claim 6 is similar to claim 4 and adding the step of retrieving the greatest depth value from the set of tiles that are spanned by the surrogate volume (Alekcisy, col. 3, lines 33-40).

As per claim 8: constructing a lower resolution coarse Z-buffer, the lower resolution coarse Z-buffer subdivide into a series of tiles, each tile having an associated depth value; and updating the depth values of the lower resolution coarse Z-buffer using Z information from the frame buffer (Ouaknine, col. 8, lines 48-50).

As per claim 9: each tile in the lower resolution coarse Z-buffer covers the same screen area as each tile in the coarse Z-buffer (Ouaknine, col. 8, lines 48-64).

As per claim 10: the tiles in the lower resolution coarse Z-buffer are overlapping (Ouaknine, abstract).

Claims 11-12 claim a system based on a method of claim 1; therefore, they are rejected under a similar reason.

Claim 13 claims a machine readable medium based on a method of claim 1; therefore, they are rejected under a similar reason.

*Response to Arguments*

5. Applicant's arguments filed 05/15/01 have been fully considered but they are not persuasive.

Applicant argues that (a) the cited references do not teach or suggest dividing the z-buffer into a series of tiles (b ) a surrogate volume; (c) each tile in the lower resolution coarse z-buffer covers the same screen area as each tile in the coarse z-buffer.

Per (a) Aleksicy's computer display being divided into a plurality of tiles does suggest the same idea of dividing the Z-buffer into a series of tiles (col. 2, lines 25-31, and fig. 1). Furthermore Ouaknine's the render region is broken into tiles teaches that the step of dividing Z-buffer into a series of tile is widely used in the art (Ouaknine, col. 5, lines 65-66).

Per (b) Aleknine teaches surrogate volume in column 3, lines 25-26.

Per (c ) Ouaknine teaches each tile in the lower resolution coarse Z-buffer covers the same screen area as each tile in the coarse Z-buffer in column 8, lines 48-64.

*Conclusion*

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

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CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

*Inquires*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Huedung Cao whose telephone number is (703) 308-5024. The examiner can normally be reached on Monday - Thursday from 6:30 am to 4:00 pm (EST). The examiner can also be reached on alternate Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Zimmerman, can be reached on (703) 305-9798.

The fax number for the organization where this application or proceeding is assigned is (703) 308-6606.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-4700.

Huedung X. Cao  
Patent Examiner

CLIFF N. VO  
PRIMARY EXAMINER

